TEST REPORT

Product Name : Datalogger
Model Number : ShineWeLink
FCC ID : 2AAJ9-WELINK

Prepared for	:	SHENZHEN GROWATT NEW ENERGY TECHNOLOGY CO., LTD.
Address	:	4-13/F, Building A, Sino-German(Europe) Industrial Park, Hangcheng Ave, Bao'an District, Shenzhen, China
Prepared by	:	EMTEK (SHENZHEN) CO., LTD.
Address	:	Building 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China Tel: (0755) 26954280 Fax: (0755) 26954282
Report Number	:	ENS2407080293W00704R
Date(s) of Tests	:	September 12, 2024 to October 11, 2024
Date of issue	:	October 11, 2024

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1 TEST RESULT CERTIFICATION

Applicant	:	SHENZHEN GROWATT NEW ENERGY TECHNOLOGY CO., LTD.
Address	:	4-13/F, Building A, Sino-German(Europe) Industrial Park, Hangcheng Ave, Bao' an District, Shenzhen, China
Manufacturer	:	SHENZHEN GROWATT NEW ENERGY CO., LTD.
Address	:	4-13/F,Building A,Sino-German(Europe) Industrial Park,Hangcheng Ave,Bao'an District,Shenzhen,China
EUT	:	Datalogger
Model Name	:	ShineWeLink
Trademark	:	GROWATT

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 2 , Subpart J FCC 47 CFR Part 15, Subpart C	**PASS**
IC RSS-GEN, Issue 5(04-2018)+A1(03-2019)+A2(02-2021) IC RSS-247 Issue 2(02-2017)	**PASS**

The above equipment was tested by EMTEK(SHENZHEN) CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 2, Part 15.247, IC RSS-247 Issue 2 and IC RSS-GEN, Issue 5.

The test results of this report relate only to the tested sample identified in this report.

Date of Test : September 12, 2024 to October 11, 2024

Prepared by : Una Yu /Editor

Reviewer : Joe Xia/Supervisor

Approve & Authorized Signer : Lisa Wang/Manager

EMTEK (SHENZHEN) CO., LTD. TESTING

Modified History

Version	Report No.	Revision Date	Summary
Ver.1.0	ENS2407080293W00704R	/	Original Report

2 EUT TECHNICAL DESCRIPTION

Product:	Datalogger
Model Number:	ShineWeLink
Test Sample S/N:	N/A
Variant Number:	N/A
Device Type：	LoRa
Modulation:	GFSK
Operating Frequency Range:	902.000066-927.900000MHz
Number of Channels:	1157 Channels
Antenna Type:	Internal Antenna
Antenna Gain:	0.61dBi
Power supply:	USB 5V(DC 5V from adapter)
Adapter 1:	MODEL:KA06E-0501000US INPUT:100-240V~50/60Hz 0.25A Max OUTPUT:5.0V/1.0A 5.0W
Adapter 2:	MODEL:MKA-0501000VU INPUT:100-240V~50/60Hz 0.4A OUTPUT:5.0V/1.0A 5.0W
Test Voltage:	AC 120V/60Hz
Temperature Range:	-20℃~+65℃
Software Version:	7.7.0.8
Hardware Version:	A Versions

Note: for more details, please refer to the User's manual of the EUT.

3 SUMMARY OF TEST RESULT

FCC Part Clause	IC Part Clause	Test Parameter	Verdict	Remark
15.247(a)(2)	RSS-247 5.2(a) RSS-Gen 6.7	Emission Bandwidth	PASS	
15.247(b)(3)	RSS-247 5.4(d) RSS-Gen 6.12	Maximum Peak Conducted Output Power	PASS	
15.247(e)	RSS-247 5.2(b) RSS-Gen 6.12	Maximum Power Spectral Density Level	PASS	
15.247(d)	RSS-247 5.5	Unwanted Emission Into Non-Restricted Frequency Bands	PASS	
15.247(d)	RSS-247 5.5	Unwanted Emission Into Restricted Frequency Bands (conducted)	PASS	
15.247(d) 15.209 15.205	RSS-Gen 8.9 RSS-Gen 8.10 RSS-Gen 6.13 RSS-247 3.3 RSS-247 5.5	Radiated Spurious Emission	PASS	
15.207	RSS-Gen 8.8	Conducted Emission Test	PASS	
15.203 15.247(b)	RSS-Gen 6.8 RSS-247 5.4	Antenna Application	PASS	
NOTE1: N/A (Not Applicable) NOTE2: According to FCC OET KDB 558074, the report use radiated measurements in the restricted frequency bands. In addition, the radiated test is also performed to ensure the emissions emanating from the device cabinet also comply with the applicable limits.				

RELATED SUBMITTAL(S)/GRANT(S):

This submittal(s) (test report) is intended for **FCC ID: 2AAJ9-WELINK** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

4 TEST METHODOLOGY

4.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:
FCC 47 CFR Part 2, Subpart J
FCC 47 CFR Part 15, Subpart C
IC RSS-GEN, Issue 5(04-2018)+A1(03-2019)+A2(02-2021)
IC RSS-247 Issue 2(02-2017)
FCC KDB 558074 D01 15.247 Meas Guidance v05r02

4.2 MEASUREMENT EQUIPMENT USED

Conducted Emission Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EMI Test Receiver	Rohde & Schwarz	ESCI	101384	2024/5/11	1Year
AMN	Rohde & Schwarz	ENV216	101161	2024/5/10	1Year

For Spurious Emissions Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EMI Test Receiver	Rohde & Schwarz	ESU 26	100154	2024/5/10	1Year
Pre-Amplifie	Lunar EM	LNA30M3G-25	J10100000070	2024/5/10	1Year
Bilog Antenna	Schwarzbeck	VULB9163	661	2023/6/2	2 Year
Horn antenna	Schwarzbeck	BBHA9120D	9120D-1177	2023/5/12	2 Year
Pre-Amplifie	SKET	LNPA_0118G-45	SK2019051801	2024/5/10	1Year
Loop Antenna	Schwarzbeck	FMZB1519	1519-012	2023/5/12	2 Year
Spectrum Analyzer	Rohde & Schwarz	FSV40	100967	2024/5/10	1Year
Horn antenna	Schwarzbeck	BBHA9170	9170-399	2023/5/12	2 Year

For other test items:

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Wideband Radio Communication Tester	R&S	CMW500	171168	2023/9/14	1Year
Frequency Extender	R&S	CMW-Z800A	100430	2023/9/14	1Year
Spectrum Analyzer	R&S	FSV3044	101289	2023/9/14	1Year
Analog Signal Generator	R&S	SMB100A	183237	2023/9/16	1Year
Vector Signal Generator	R&S	SMM100A	101808	2023/9/16	1Year
RF Control Unit(Power Meter)	Tonscend	JS0806-2	22C8060567	2023/9/14	1Year
Temperature&Humidity Chamber	ESPEC	EL-02KA	12107166	2024/5/10	1 Year

4.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition.
The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Frequency and Channel list:

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (MHz)
902.000066	905.824176	910.411980	915.382360	919.206235	923.794648
902.000100	905.824200	910.411992	915.382361	919.206246	923.794671
902.000134	905.824224	910.412004	915.382362	919.970589	923.794694
902.000168	905.824248	910.412016	915.382363	919.970602	923.794717
902.000202	905.824272	910.412028	915.382364	919.970615	923.794740
902.000236	905.824296	910.412040	915.382365	919.970628	923.794763
902.000270	905.824320	910.412052	915.382366	919.970641	923.794786
902.000304	905.824344	910.412064	915.382367	919.970654	923.794809
902.000338	905.824368	910.412076	915.382368	919.970667	923.794832
902.000372	906.588278	910.412088	915.382369	919.970680	923.794855
902.000406	906.588300	910.412100	915.382370	919.970693	923.794878
902.000440	906.588322	910.412112	915.382371	919.970706	924.558825
902.000474	906.588344	910.412124	915.382372	919.970719	924.558850
902.000508	906.588366	910.412136	915.382373	919.970732	924.558875
902.000542	906.588388	910.412148	915.382374	919.970745	924.558900
902.000576	906.588410	910.412160	915.382375	919.970758	924.558925
902.000610	906.588432	910.412172	915.382376	919.970771	924.558950
902.000644	906.588454	910.412184	915.382377	919.970784	924.558975
902.000678	906.588476	911.176490	915.382378	919.970797	924.559000
902.000712	906.588498	911.176500	915.382379	919.970810	924.559025
902.000746	906.588520	911.176510	915.382380	919.970823	924.559050
902.000780	906.588542	911.176520	915.382381	919.970836	924.559075
902.000814	906.588564	911.176530	915.382382	919.970849	924.559100
902.000848	906.588586	911.176540	915.382383	919.970862	924.559125
902.000882	906.588608	911.176550	915.382384	919.970875	924.559150
902.000916	906.588630	911.176560	915.382385	919.970888	924.559175
902.000950	906.588652	911.176570	915.382386	919.970901	924.559200
902.000984	906.588674	911.176580	916.147059	919.970914	924.559225
902.001018	906.588696	911.176590	916.147062	919.970927	924.559250

902.001052	906.588718	911.176600	916.147065	919.970940	924.559275
902.001086	906.588740	911.176610	916.147068	919.970953	924.559300
902.001120	906.588762	911.176620	916.147071	919.970966	924.559325
902.001154	906.588784	911.176630	916.147074	919.970979	924.559350
902.001188	906.588806	911.176640	916.147077	919.970992	924.559375
902.764768	906.588828	911.176650	916.147080	919.971005	924.559400
902.764800	906.588850	911.176660	916.147083	919.971018	924.559425
902.764832	906.588872	911.176670	916.147086	920.735295	924.559450
902.764864	906.588894	911.176680	916.147089	920.735310	924.559475
902.764896	906.588916	911.176690	916.147092	920.735325	924.559500
902.764928	906.588938	911.176700	916.147095	920.735340	924.559525
902.764960	906.588960	911.176710	916.147098	920.735355	924.559550
902.764992	906.588982	911.176720	916.147101	920.735370	924.559575
902.765024	906.589004	911.176730	916.147104	920.735385	924.559600
902.765056	907.352980	911.176740	916.147107	920.735400	924.559625
902.765088	907.353000	911.176750	916.147110	920.735415	924.559650
902.765120	907.353020	911.176760	916.147113	920.735430	925.323531
902.765152	907.353040	911.176770	916.147116	920.735445	925.323558
902.765184	907.353060	911.176780	916.147119	920.735460	925.323585
902.765216	907.353080	911.176790	916.147122	920.735475	925.323612
902.765248	907.353100	911.176800	916.147125	920.735490	925.323639
902.765280	907.353120	911.176810	916.147128	920.735505	925.323666
902.765312	907.353140	911.176820	916.147131	920.735520	925.323693
902.765344	907.353160	911.941192	916.147134	920.735535	925.323720
902.765376	907.353180	911.941200	916.147137	920.735550	925.323747
902.765408	907.353200	911.941208	916.147140	920.735565	925.323774
902.765440	907.353220	911.941216	916.147143	920.735580	925.323801
902.765472	907.353240	911.941224	916.147146	920.735595	925.323828
902.765504	907.353260	911.941232	916.147149	920.735610	925.323855
902.765536	907.353280	911.941240	916.147152	920.735625	925.323882
902.765568	907.353300	911.941248	916.147155	920.735640	925.323909
902.765600	907.353320	911.941256	916.147158	920.735655	925.323936
902.765632	907.353340	911.941264	916.911765	920.735670	925.323963
902.765664	907.353360	911.941272	916.911770	920.735685	925.323990
902.765696	907.353380	911.941280	916.911775	920.735700	925.324017
902.765728	907.353400	911.941288	916.911780	920.735715	925.324044
902.765760	907.353420	911.941296	916.911785	920.735730	925.324071
902.765792	907.353440	911.941304	916.911790	920.735745	925.324098
902.765824	907.353460	911.941312	916.911795	920.735760	925.324125
903.529470	907.353480	911.941320	916.911800	920.735775	925.324152
903.529500	907.353500	911.941328	916.911805	920.735790	925.324179
903.529530	907.353520	911.941336	916.911810	921.500001	925.324206
903.529560	907.353540	911.941344	916.911815	921.500018	925.324233
903.529590	907.353560	911.941352	916.911820	921.500035	925.324260
903.529620	907.353580	911.941360	916.911825	921.500052	925.324287
903.529650	907.353600	911.941368	916.911830	921.500069	925.324314
903.529680	907.353620	911.941376	916.911835	921.500086	925.324341

903.529710	907.353640	911.941384	916.911840	921.500103	925.324368
903.529740	908.117682	911.941392	916.911845	921.500120	925.324395
903.529770	908.117700	911.941400	916.911850	921.500137	925.324422
903.529800	908.117718	911.941408	916.911855	921.500154	926.088237
903.529830	908.117736	911.941416	916.911860	921.500171	926.088266
903.529860	908.117754	911.941424	916.911865	921.500188	926.088295
903.529890	908.117772	911.941432	916.911870	921.500205	926.088324
903.529920	908.117790	911.941440	916.911875	921.500222	926.088353
903.529950	908.117808	911.941448	916.911880	921.500239	926.088382
903.529980	908.117826	911.941456	916.911885	921.500256	926.088411
903.530010	908.117844	912.705894	916.911890	921.500273	926.088440
903.530040	908.117862	912.705900	916.911895	921.500290	926.088469
903.530070	908.117880	912.705906	916.911900	921.500307	926.088498
903.530100	908.117898	912.705912	916.911905	921.500324	926.088527
903.530130	908.117916	912.705918	916.911910	921.500341	926.088556
903.530160	908.117934	912.705924	916.911915	921.500358	926.088585
903.530190	908.117952	912.705930	916.911920	921.500375	926.088614
903.530220	908.117970	912.705936	916.911925	921.500392	926.088643
903.530250	908.117988	912.705942	916.911930	921.500409	926.088672
903.530280	908.118006	912.705948	917.676471	921.500426	926.088701
903.530310	908.118024	912.705954	917.676478	921.500443	926.088730
903.530340	908.118042	912.705960	917.676485	921.500460	926.088759
903.530370	908.118060	912.705966	917.676492	921.500477	926.088788
903.530400	908.118078	912.705972	917.676499	921.500494	926.088817
903.530430	908.118096	912.705978	917.676506	921.500511	926.088846
903.530460	908.118114	912.705984	917.676513	921.500528	926.088875
904.294172	908.118132	912.705990	917.676520	921.500545	926.088904
904.294200	908.118150	912.705996	917.676527	921.500562	926.088933
904.294228	908.118168	912.706002	917.676534	922.264707	926.088962
904.294256	908.118186	912.706008	917.676541	922.264726	926.088991
904.294284	908.118204	912.706014	917.676548	922.264745	926.089020
904.294312	908.118222	912.706020	917.676555	922.264764	926.089049
904.294340	908.118240	912.706026	917.676562	922.264783	926.089078
904.294368	908.118258	912.706032	917.676569	922.264802	926.089107
904.294396	908.118276	912.706038	917.676576	922.264821	926.089136
904.294424	908.882384	912.706044	917.676583	922.264840	926.089165
904.294452	908.882400	912.706050	917.676590	922.264859	926.089194
904.294480	908.882416	912.706056	917.676597	922.264878	926.852943
904.294508	908.882432	912.706062	917.676604	922.264897	926.852974
904.294536	908.882448	912.706068	917.676611	922.264916	926.853005
904.294564	908.882464	912.706074	917.676618	922.264935	926.853036
904.294592	908.882480	912.706080	917.676625	922.264954	926.853067
904.294620	908.882496	912.706086	917.676632	922.264973	926.853098
904.294648	908.882512	912.706092	917.676639	922.264992	926.853129
904.294676	908.882528	913.470596	917.676646	922.265011	926.853160
904.294704	908.882544	913.470600	917.676653	922.265030	926.853191
904.294732	908.882560	913.470604	917.676660	922.265049	926.853222

904.294760	908.882576	913.470608	917.676667	922.265068	926.853253
904.294788	908.882592	913.470612	917.676674	922.265087	926.853284
904.294816	908.882608	913.470616	917.676681	922.265106	926.853315
904.294844	908.882624	913.470620	917.676688	922.265125	926.853346
904.294872	908.882640	913.470624	917.676695	922.265144	926.853377
904.294900	908.882656	913.470628	917.676702	922.265163	926.853408
904.294928	908.882672	913.470632	918.441177	922.265182	926.853439
904.294956	908.882688	913.470636	918.441186	922.265201	926.853470
904.294984	908.882704	913.470640	918.441195	922.265220	926.853501
904.295012	908.882720	913.470644	918.441204	922.265239	926.853532
904.295040	908.882736	913.470648	918.441213	922.265258	926.853563
904.295068	908.882752	913.470652	918.441222	922.265277	926.853594
904.295096	908.882768	913.470656	918.441231	922.265296	926.853625
905.058874	908.882784	913.470660	918.441240	922.265315	926.853656
905.058900	908.882800	913.470664	918.441249	922.265334	926.853687
905.058926	908.882816	913.470668	918.441258	923.029413	926.853718
905.058952	908.882832	913.470672	918.441267	923.029434	926.853749
905.058978	908.882848	913.470676	918.441276	923.029455	926.853780
905.059004	908.882864	913.470680	918.441285	923.029476	926.853811
905.059030	908.882880	913.470684	918.441294	923.029497	926.853842
905.059056	908.882896	913.470688	918.441303	923.029518	926.853873
905.059082	908.882912	913.470692	918.441312	923.029539	926.853904
905.059108	909.647086	913.470696	918.441321	923.029560	926.853935
905.059134	909.647100	913.470700	918.441330	923.029581	926.853966
905.059160	909.647114	913.470704	918.441339	923.029602	927.617649
905.059186	909.647128	913.470708	918.441348	923.029623	927.617682
905.059212	909.647142	913.470712	918.441357	923.029644	927.617715
905.059238	909.647156	913.470716	918.441366	923.029665	927.617748
905.059264	909.647170	913.470720	918.441375	923.029686	927.617781
905.059290	909.647184	913.470724	918.441384	923.029707	927.617814
905.059316	909.647198	913.470728	918.441393	923.029728	927.617847
905.059342	909.647212	914.235298	918.441402	923.029749	927.617880
905.059368	909.647226	914.235300	918.441411	923.029770	927.617913
905.059394	909.647240	914.235302	918.441420	923.029791	927.617946
905.059420	909.647254	914.235304	918.441429	923.029812	927.617979
905.059446	909.647268	914.235306	918.441438	923.029833	927.618012
905.059472	909.647282	914.235308	918.441447	923.029854	927.618045
905.059498	909.647296	914.235310	918.441456	923.029875	927.618078
905.059524	909.647310	914.235312	918.441465	923.029896	927.618111
905.059550	909.647324	914.235314	918.441474	923.029917	927.618144
905.059576	909.647338	914.235316	919.205883	923.029938	927.618177
905.059602	909.647352	914.235318	919.205894	923.029959	927.618210
905.059628	909.647366	914.235320	919.205905	923.029980	927.618243
905.059654	909.647380	914.235322	919.205916	923.030001	927.618276
905.059680	909.647394	914.235324	919.205927	923.030022	927.618309
905.059706	909.647408	914.235326	919.205938	923.030043	927.618342
905.059732	909.647422	914.235328	919.205949	923.030064	927.618375

905.823576	909.647436	914.235330	919.205960	923.030085	927.618408
905.823600	909.647450	914.235332	919.205971	923.030106	927.618441
905.823624	909.647464	914.235334	919.205982	923.794119	927.618474
905.823648	909.647478	914.235336	919.205993	923.794142	927.618507
905.823672	909.647492	914.235338	919.206004	923.794165	927.618540
905.823696	909.647506	914.235340	919.206015	923.794188	927.618573
905.823720	909.647520	914.235342	919.206026	923.794211	927.618606
905.823744	909.647534	914.235344	919.206037	923.794234	927.618639
905.823768	909.647548	914.235346	919.206048	923.794257	927.618672
905.823792	910.411788	914.235348	919.206059	923.794280	927.618705
905.823816	910.411800	914.235350	919.206070	923.794303	927.618738
905.823840	910.411812	914.235352	919.206081	923.794326	927.900000
905.823864	910.411824	914.235354	919.206092	923.794349	
905.823888	910.411836	914.235356	919.206103	923.794372	
905.823912	910.411848	914.235358	919.206114	923.794395	
905.823936	910.411860	914.235360	919.206125	923.794418	
905.823960	910.411872	914.235362	919.206136	923.794441	
905.823984	910.411884	914.235364	919.206147	923.794464	
905.824008	910.411896	915.382353	919.206158	923.794487	
905.824032	910.411908	915.382354	919.206169	923.794510	
905.824056	910.411920	915.382355	919.206180	923.794533	
905.824080	910.411932	915.382356	919.206191	923.794556	
905.824104	910.411944	915.382357	919.206202	923.794579	
905.824128	910.411956	915.382358	919.206213	923.794602	
905.824152	910.411968	915.382359	919.206224	923.794625	

Test Frequency and channel:

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low	902.000066	Middle	915.382374	High	927.900000

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at:

EMTEK (Shenzhen) Co., Ltd.
Building 69, Majialong Industry Zone District, Nanshan District, Shenzhen, China
The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description		
EMC Lab.	:	**Accredited by CNAS** The Certificate Registration Number is L2291. The Laboratory has been assessed and proved to be in compliance with CNAS-CL01 (identical to ISO/IEC 17025:2017) **Accredited by FCC** Designation Number: CN1204 Test Firm Registration Number: 882943 **Accredited by A2LA** The Certificate Number is 4321.01. Accredited by Industry Canada The Conformity Assessment Body Identifier is CN0008
Name of Firm	:	EMTEK (SHENZHEN) CO., LTD.
Site Location	:	Building 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

6 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

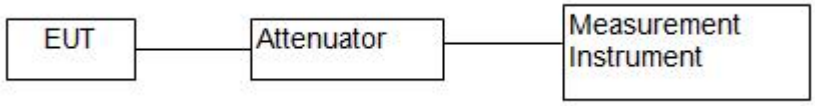
Test Parameter	Measurement Uncertainty
Radio Frequency	±1x10^-5
Maximum Peak Output Power Test	±1.0dB
Conducted Emissions Test	±2.0dB
Radiated Emission Test	±2.0dB
Power Density	±2.0dB
Occupied Bandwidth Test	±1.0dB
Band Edge Test	±3dB
All emission, radiated	±3dB
Antenna Port Emission	±3dB
Temperature	±0.5℃
Humidity	±3%

Measurement Uncertainty for a level of Confidence of 95%

7 SETUP OF EQUIPMENT UNDER TEST

7.1 RADIO FREQUENCY TEST SETUP 1

The component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



7.2 RADIO FREQUENCY TEST SETUP 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.
The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

Below 30MHz：
The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The Antenna should be positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. The center of the loop shall be 1 m above the ground. For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT.

Above 30MHz：
The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

Above 1GHz:
The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

Measurements shall be taken, using the following steps, at a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space environment (see RSS-Gen for applicable versions of ANSI and CISPR standards).
(1) Line the ground plane with absorbers between the transmitter and the receive antenna to minimize reflections. The absorbers used should have a minimum-rated attenuation of 20 dB through the measurement frequency range of interest. The absorbers shall be positioned to replicate the layout used when compliance with the applicable acceptability criterion was achieved, as set forth in the aforementioned standards on site validation.
(2) Set the height of the receive antenna to 1.5 m. The receive antenna must be one that was designed and fabricated to operate over the entire frequency range of interest, for example, an appropriate standard gain horn.
(3) The distance between the receive antenna and the radiating source shall be sufficient in order to ensure far-field conditions.
(4) Mount the transmitter at a height of 1.5 m.
(5) Configure the device under test (DUT) to produce the maximum power spectral density as measured while assessing compliance with Section 6.2.2 (i.e. channel frequency, modulation type and data rate). If the DUT is equipped with a detachable antenna and the antenna is intended for remote installation (i.e.

tower-mounted), the DUT may be substituted with a suitable signal generator. The level and frequency settings on the generator shall be set so as to reproduce the maximum power spectral density, measured within a 1 MHz bandwidth, obtained while assessing compliance to Section 6.2.2.
(6) Position the transmitter or the radiating antenna so that elevation pattern measurements can be taken.
(7) Find the 0° reference point in the horizontal plane.
(8) Care should be taken when positioning the receive antenna to avoid cross-polarization. Antennas of known mounting polarization should be assessed with the receive antenna oriented in the same polarity. If the polarization of the transmit antenna is unknown or the transmit antenna can be mounted in either polarization, e.i.r.p. measurements should be performed to find which
mounting polarity provides the highest e.i.r.p. value. Testing shall be carried out with the receive antenna and the DUT mounted in each polarity.
(9) The emission shall be centred on the display of the spectrum analyzer with the following settings:
i. If the power spectral density of the DUT was assessed with a peak detector and the antenna cannot be detached from the DUT, the spectrum analyzer shall be set to a peak detector with a resolution bandwidth and video bandwidth of 1 MHz.
ii. If the power spectral density of the DUT was assessed using a sample detector with power averaging and the antenna cannot be detached from the DUT, the spectrum analyzer shall be set to a sample detector, configured to produce 100 power averages and set with a resolution bandwidth, as well as a video bandwidth of 1 MHz.
iii. If the antenna can be detached from the DUT, a continuous wave (CW) signal equal to that of the power spectral density measurement may be used, the spectrum analyzer shall be set to peak detector with a resolution bandwidth and video bandwidth of 1 MHz.

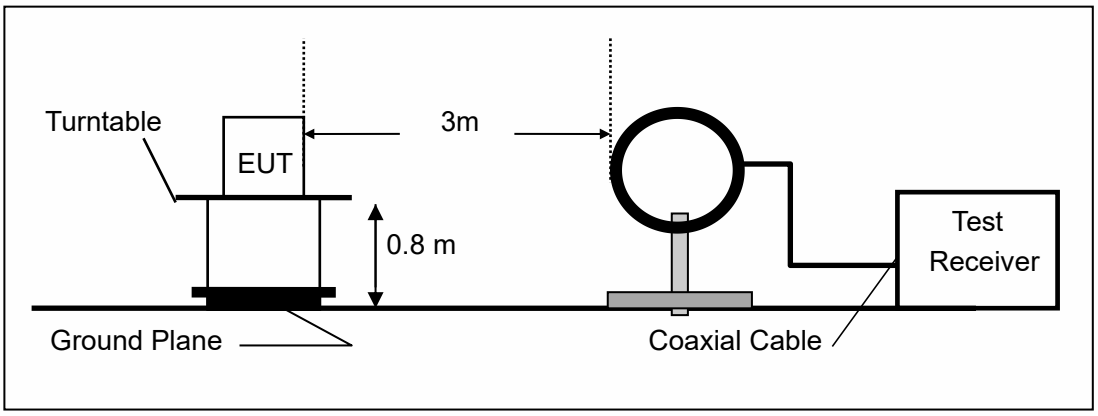
(10) Rotate the turntable 360° recording the field strength at each step. Throughout the main beam of the antenna, the step size shall be kept to a maximum of 1°.
Once outside the main beam of the antenna, the maximum step size shall be as follows, when compared to the requirements of Section 6.2.2:
i. Between 0° and 8°, maximum step size of 2°;
ii. Between 8° and 40°, maximum step size of 4°;
iii. Between 40° and 45°, maximum step size of 1°;
iv. Between 45° and 90°, maximum step size of 5°.
Once the mask reaches 90°, the mask will be inverted and the step size will follow in the same manner as above.
For the purpose of this procedure, the main beam of the antenna is defined as the 3 dB beamwidth.
(11) Convert the measured field strength values in terms of e.i.r.p. density (dBW/1 MHz) using the following equation:

$$\text{e.i.r.p density(dBW/MHz)} = 10\log((E*r)^2/30)$$

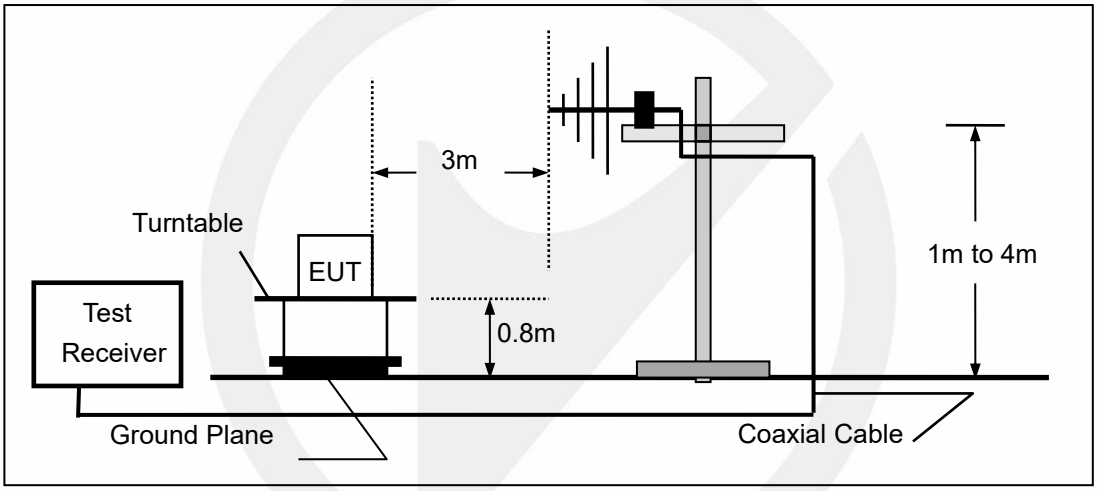
E = field strength in V/m
r = measurement distance in metres

(12) Plot the results against the emission mask with reference to the horizontal plane.
(13) Using the plot, the 0° can be rotated to determine the worst-case installation tilt angle.
(14) Testing shall be performed using the highest gain antenna for every antenna type, if applicable.
(15) Antenna type(s), antenna model number(s), and worst-case tilt angle(s) necessary to remain compliant with the elevation mask requirement set forth in Section 6.2.2(3) of RSS-247 shall be clearly indicated in the user manual.
The following figure is an example of a polar elevation mask measured using the Method 1 reference to dBµV/m at 3 m.

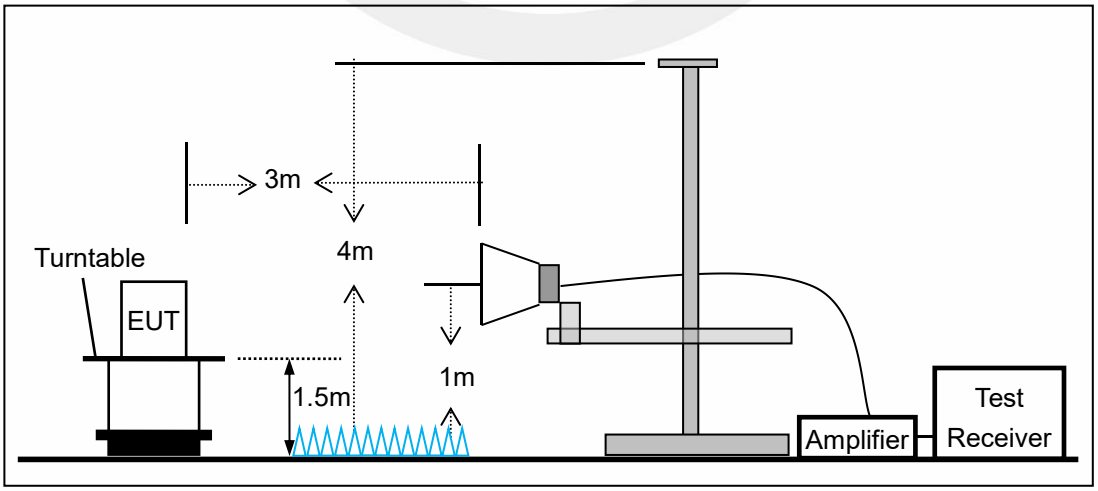
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



(b) Radiated Emission Test Set-Up, Frequency Below 1000MHz

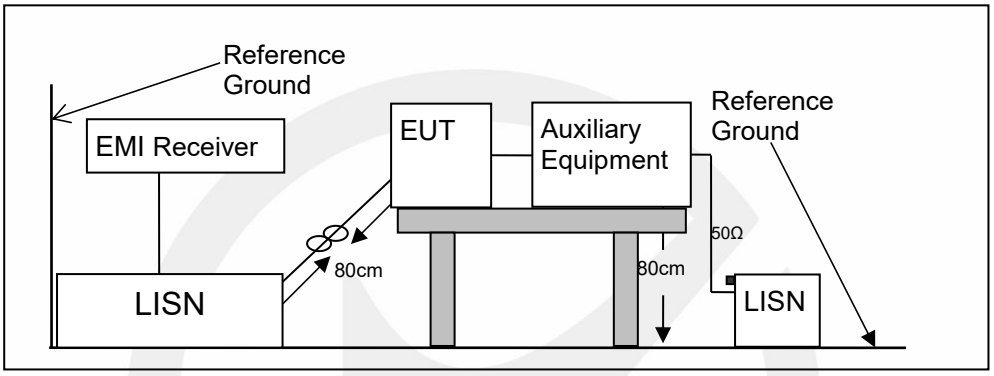


(c) Radiated Emission Test Set-Up, Frequency above 1000MHz

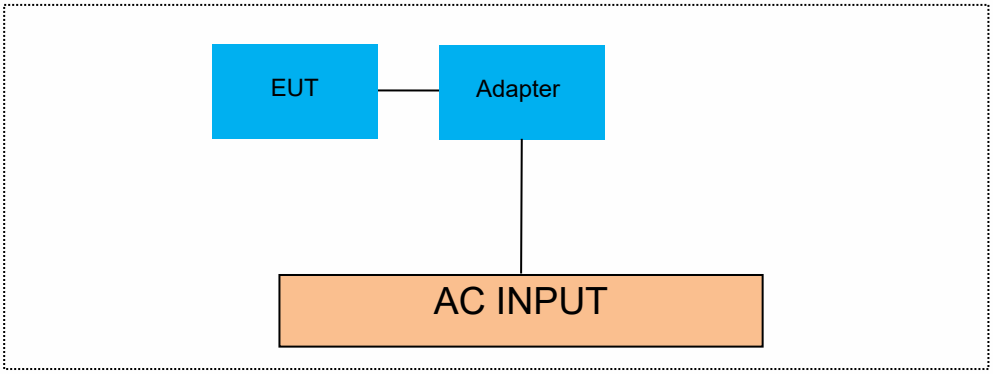


7.3 CONDUCTED EMISSION TEST SETUP

The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.
Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.8 m.
According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.



7.4 BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM



7.5 SUPPORT EQUIPMENT

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/

Notes:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

8 TEST REQUIREMENTS

8.1 DTS 6DB BANDWIDTH

8.1.1 Applicable Standard

According to FCC Part15.247 (a)(2)
According to RSS-247 5.2(a)
According to 558074 D01 15.247 Meas Guidance v05r02 Section 8.2
According to ANSI C63.10 Section 11.8

8.1.2 Conformance Limit

The minimum -6 dB bandwidth shall be at least 500 kHz.

8.1.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

8.1.4 Test Procedure

The EUT was operating in TX mode and controlled its channel. Printed out the test result from the spectrum by hard copy function.
The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
Set to the maximum power setting and enable the EUT transmit continuously
Set RBW = 100 kHz.
Set the video bandwidth (VBW) =300 kHz.
Set Span=2 times OBW
Set Detector = Peak.
Set Trace mode = max hold.
Set Sweep = auto couple.
Allow the trace to stabilize.
Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
Measure and record the results in the test report.

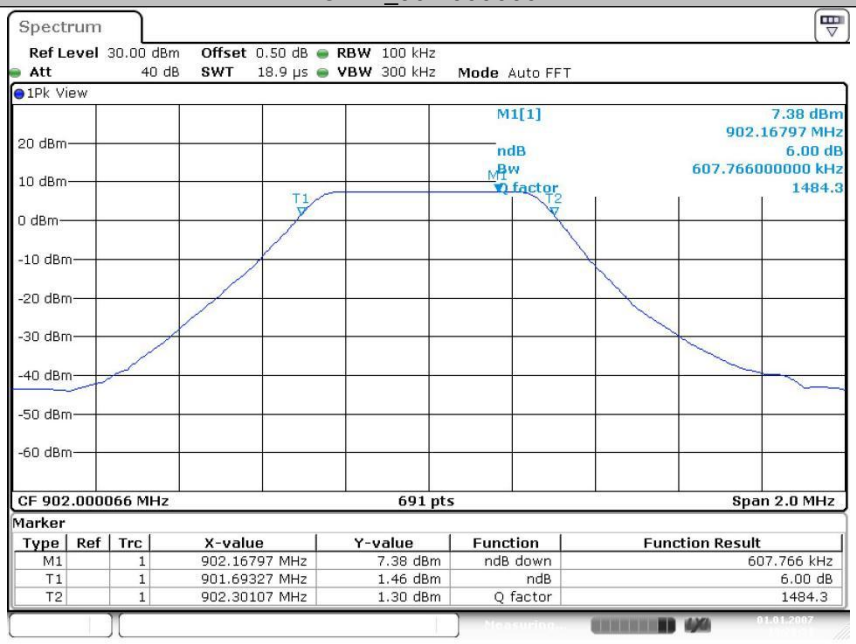
Test Results

Temperature:	25°C
Relative Humidity:	45%
ATM Pressure:	1011 mbar
Test Engineer:	XXH

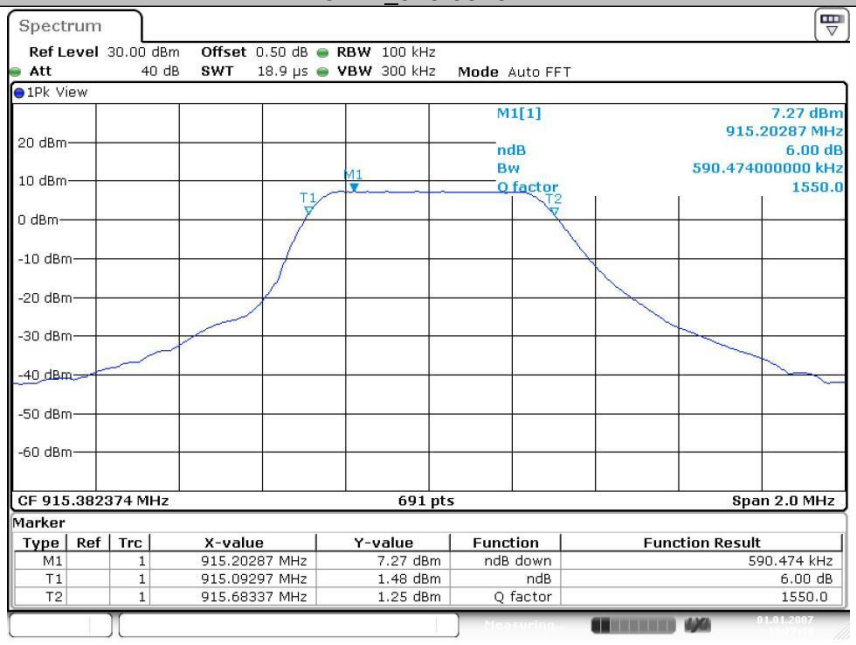
Note: N/A

Test Mode	Antenna	Frequency[MHz]	DTS BW [MHz]	Limit[MHz]	Verdict
GFSK	Ant1	902.000066	0.608	0.5	PASS
		915.382374	0.590	0.5	PASS
		927.900000	0.617	0.5	PASS

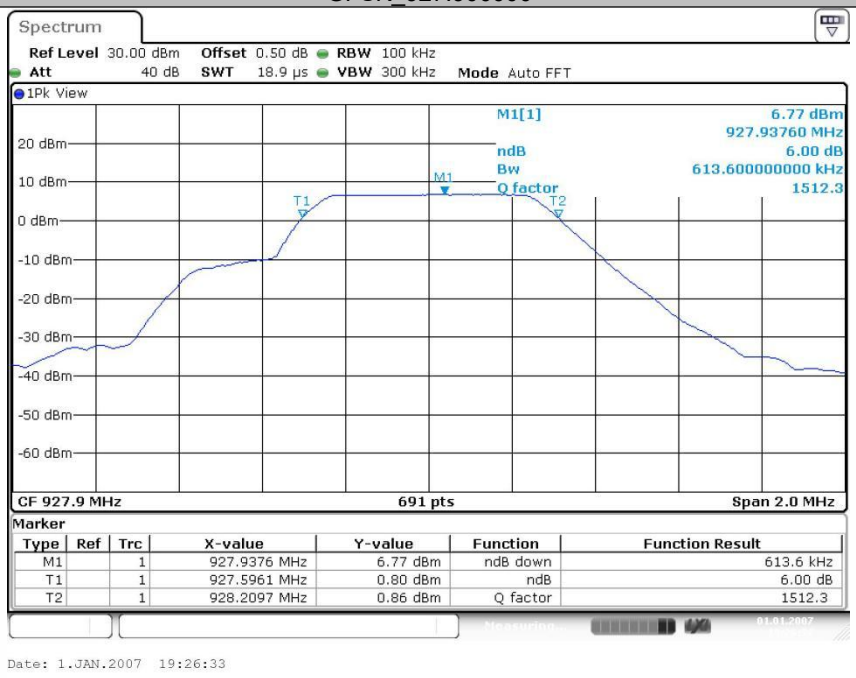
GFSK_902.000066



GFSK_915.382374



GFSK_927.900000



8.2 DTS 99% BANDWIDTH

8.2.1 Applicable Standard

According to RSS-Gen 6.7

8.2.2 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

8.2.3 Test Procedure

The EUT was operating in TX mode and controlled its channel. Printed out the test result from the spectrum by hard copy function.
The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
Set to the maximum power setting and enable the EUT transmit continuously
Set RBW = 1%-5% OBW(20KHz).
Set the video bandwidth (VBW) =100 kHz.
Set Span=4MHz
Set Detector = Peak.
Set Trace mode = max hold.
Set Sweep = auto couple.
Allow the trace to stabilize.
Use the 99 % power bandwidth function of the instrument
Measure the maximum width of the emission.
Measure and record the results in the test report.

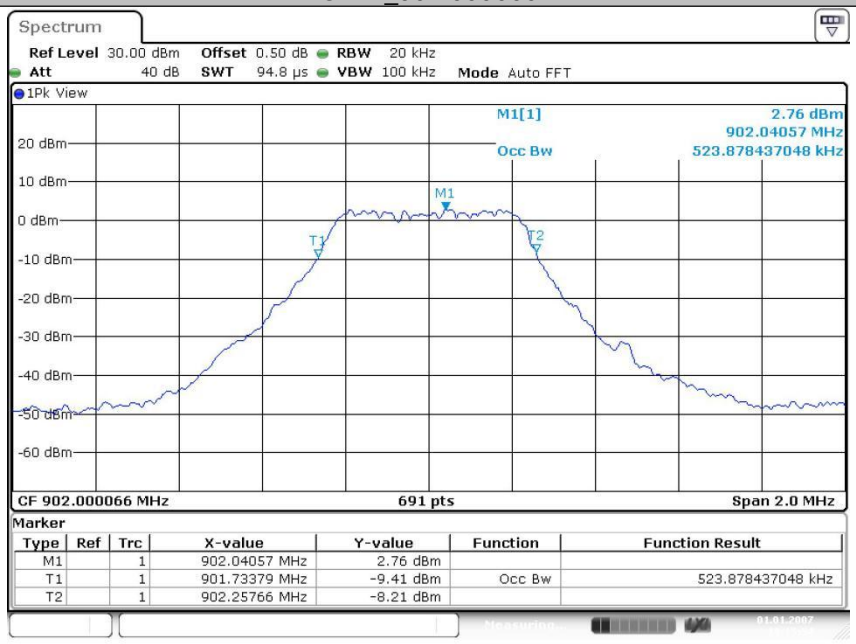
8.2.4 Test Results

Temperature:	25˚C
Relative Humidity:	45%
ATM Pressure:	1011 mbar
Test Engineer:	XXH

Note: N/A

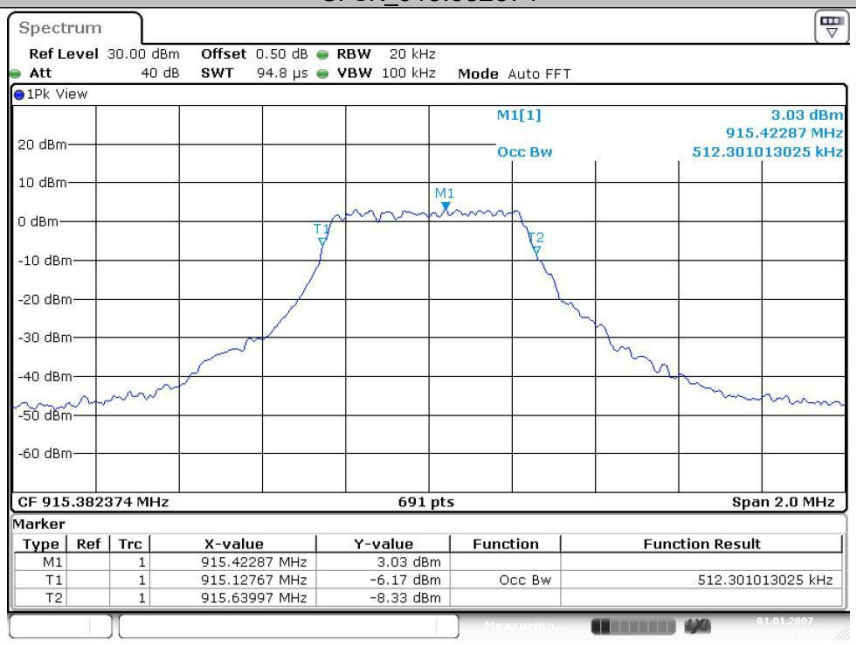
TestMode	Antenna	Frequency[MHz]	OBW [MHz]	Limit[MHz]	Verdict
GFSK	Ant1	902.000066	0.5239	---	---
		915.382374	0.5123	---	---
		927.900000	0.6744	---	---

GFSK_902.000066



Date: 1.JAN.2007 19:15:54

GFSK_915.382374



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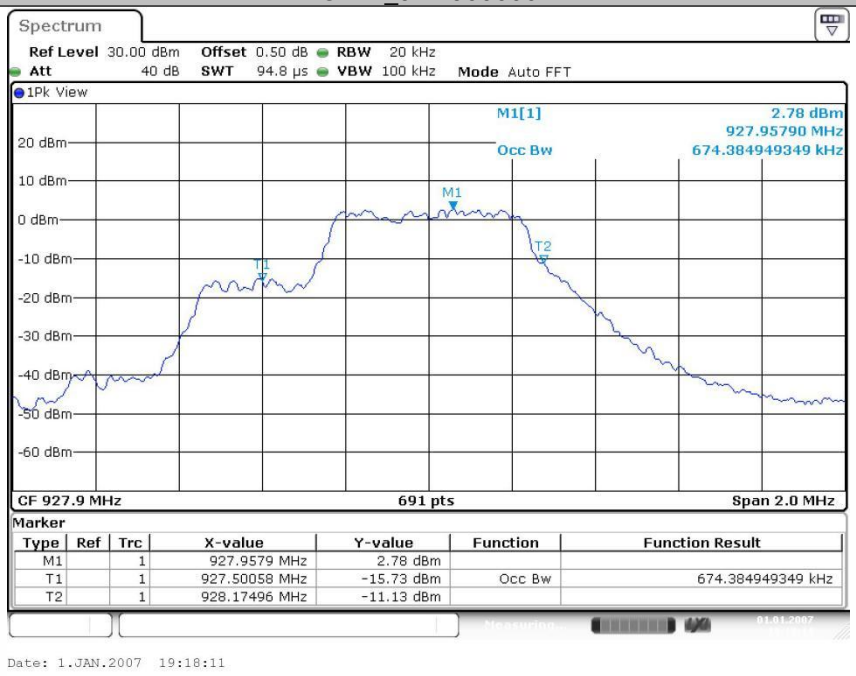


8.3 MAXIMUM PEAK CONDUCTED OUTPUT POWER

8.3.1 Applicable Standard

According to FCC Part15.247 (b)(3)
According to RSS-247 5.4(d)
According to RSS-Gen 6.12
According to 558074 D01 15.247 Meas Guidance v05r02 Section 8.3.2.2
According to ANSI C63.10 Section 11.9.2.2.4

8.3.2 Conformance Limit

The maximum peak conducted output power of the intentional radiator for systems using digital modulation in the 902-928 MHz bands shall not exceed: 1 Watt (30dBm).

8.3.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

8.3.4 Test Procedure

a) Measure the duty cycle D of the transmitter output signal.
b) Set span to at least 1.5 times the OBW.
c) Set RBW = 1% to 5% of the OBW, not to exceed 1 MHz.
d) Set VBW ≥ [3 × RBW].
e) Number of points in sweep ≥ [2 × span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
f) Sweep time = auto.
g) Detector = RMS (i.e., power averaging), if available. Otherwise, use the sample detector mode.
h) Do not use sweep triggering. Allow the sweep to “free run.”
i) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.
j) Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
k) Add [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the ON and OFF times of the transmission). For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is 25%.

■ According to FCC Part 15.247(b)(4):
Conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
Note: If antenna Gain exceeds 6 dBi, then Output power Limit=30-(Gain- 6)

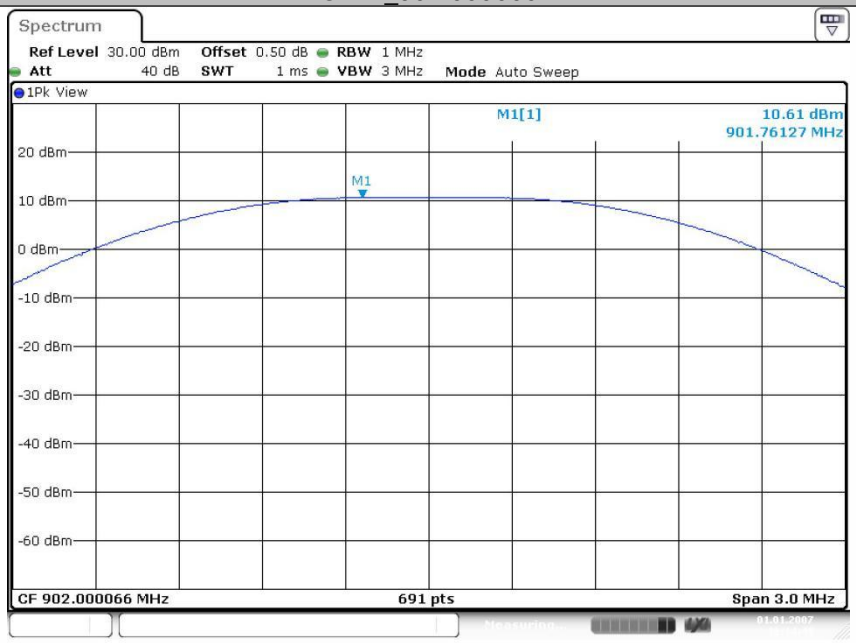
8.3.5 Test Results

Temperature:	25 ˚C
Relative Humidity:	45%
ATM Pressure:	1011 mbar
Test Engineer:	XXH

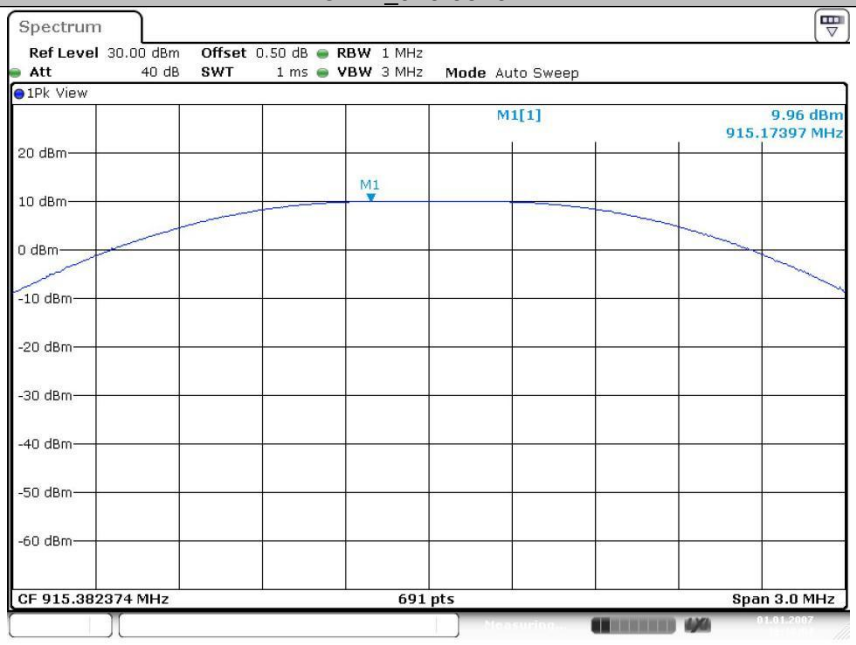
Note: N/A

TestMode	Antenna	Frequency[MHz]	Conducted Peak Powert[dBm]	Conducted Limit[dBm]	Verdict
GFSK	Ant1	902.000066	10.61	≤30	PASS
		915.382374	9.96	≤30	PASS
		927.900000	9.73	≤30	PASS

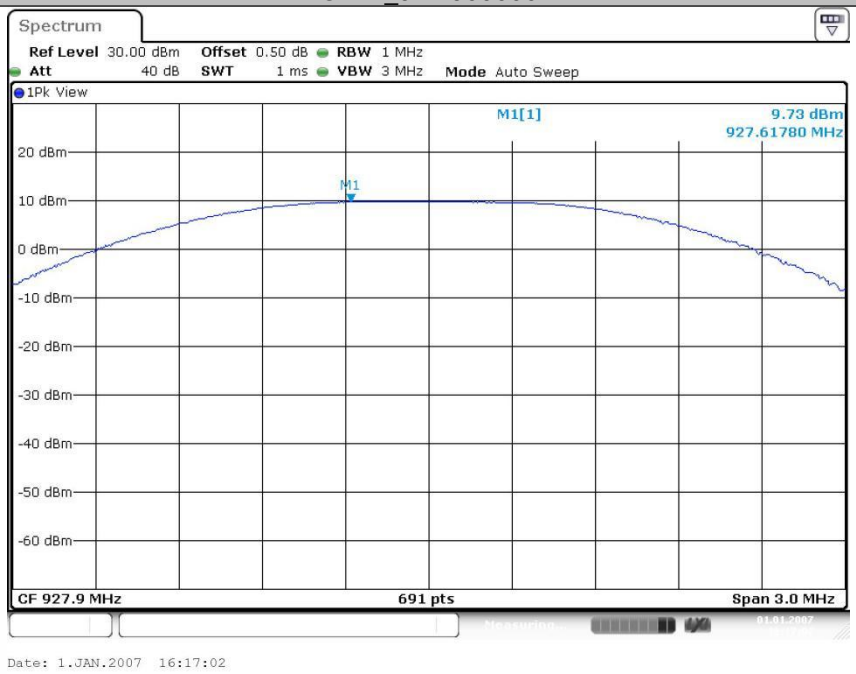
GFSK_902.000066



GFSK_915.382374



GFSK_927.900000



8.4 MAXIMUM POWER SPECTRAL DENSITY

8.4.1 Applicable Standard

According to FCC Part15.247(e)
According to RSS-247 5.2(b)
According to RSS-Gen 6.12
According to 558074 D01 15.247 Meas Guidance v05r02 Section 8.4
According to ANSI C63.10 Section 11.10.5

8.4.2 Conformance Limit

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

8.4.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

8.4.4 Test Procedure

a) Measure the duty cycle (D) of the transmitter output signal
b) Set instrument center frequency to DTS channel center frequency.
c) Set span to at least 1.5 times the OBW.
d) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
e) Set VBW ≥ [3 × RBW].
f) Detector = power averaging (rms) or sample detector (when rms not available).
g) Ensure that the number of measurement points in the sweep ≥ [2 × span / RBW].
h) Sweep time = auto couple.
i) Do not use sweep triggering; allow sweep to “free run.”
j) Employ trace averaging (rms) mode over a minimum of 100 traces.
k) Use the peak marker function to determine the maximum amplitude level.
l) Add [10 log (1 / D)], where D is the duty cycle measured in step a), to the measured PSD to compute the average PSD during the actual transmission time.
m) If measured value exceeds requirement specified by regulatory agency, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).

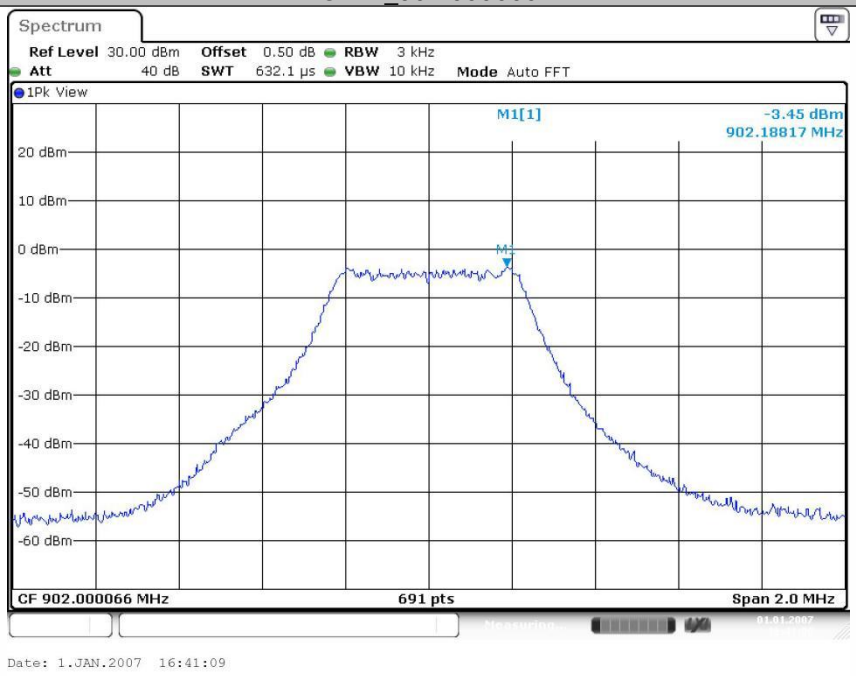
8.4.5 Test Results

Temperature:	25 ˚C
Relative Humidity:	45%
ATM Pressure:	1011 mbar
Test Engineer:	XXH

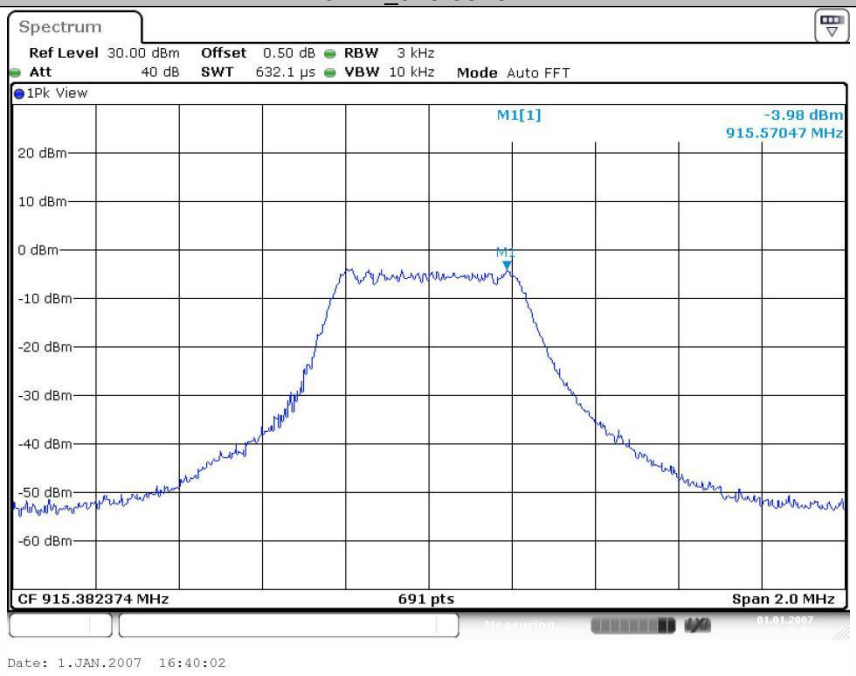
Note: N/A

TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
GFSK	Ant1	902.000066	-3.45	≤8.00	PASS
		915.382374	-3.98	≤8.00	PASS
		927.900000	-5.01	≤8.00	PASS

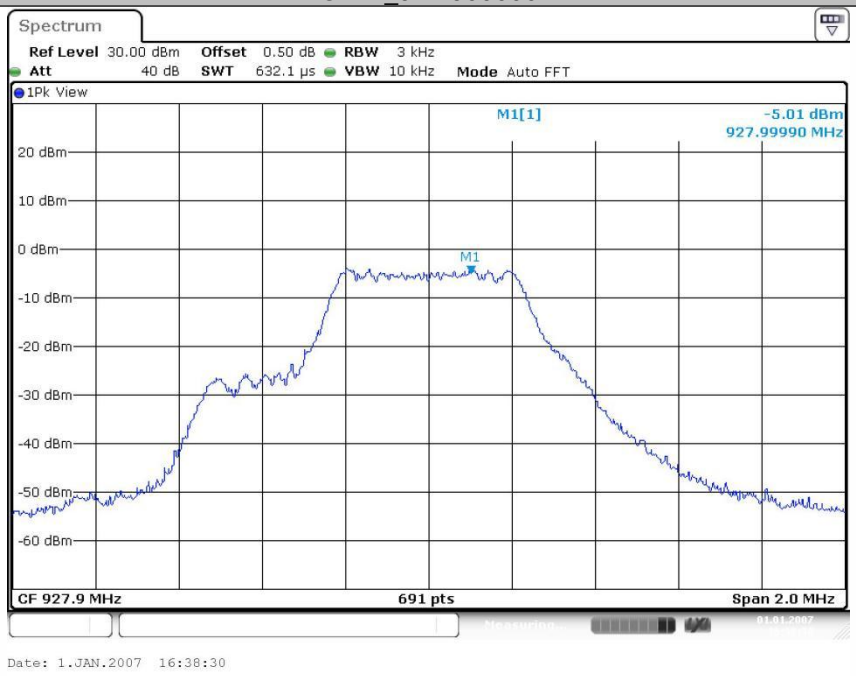
GFSK_902.000066



GFSK_915.382374



GFSK_927.900000



8.5 UNWANTED EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

8.5.1 Applicable Standard

According to FCC Part15.247(d)
According to RSS-247 5.5
According to 558074 D01 15.247 Meas Guidance v05r02 Section 8.5
According to ANSI C63.10 Section 11.11

8.5.2 Conformance Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

8.5.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

8.5.4 Test Procedure

The transmitter output (antenna port) was connected to the spectrum analyzer

- **Reference level measurement**

Establish a reference level by using the following procedure:
Set instrument center frequency to DTS channel center frequency.
Set the span to = 1.5 times the DTS bandwidth.
Set the RBW = 100 kHz.
Set the VBW ≥ 3 x RBW.
Set Detector = peak.
Set Sweep time = auto couple.
Set Trace mode = max hold.
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum PSD level.
Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

- **Band-edge measurement**

Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation
Set RBW ≥ 1% of the span=100kHz Set VBW ≥ 3 x RBW
Set Sweep = auto Set Detector function = peak Set Trace = max hold
Allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section.

- **Emission level measurement**

Set the center frequency and span to encompass frequency range to be measured.
Set the RBW = 100 kHz.
Set the VBW =300 kHz.
Set Detector = peak
Sweep time = auto couple.

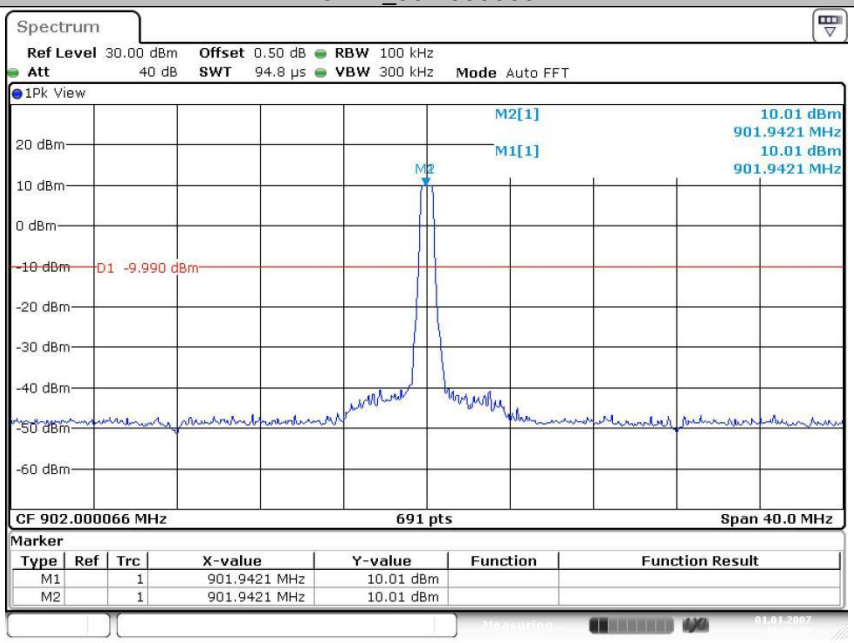
Trace mode = max hold.
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum amplitude level.
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements . Report the three highest emissions relative to the limit.

8.5.5 Test Results

Temperature:	25 ˚C
Relative Humidity:	45%
ATM Pressure:	1011 mbar
Test Engineer:	XXH

TestMode	Antenna	Frequency[MHz]	Verdict
GFSK	Ant1	902.000066	PASS
		915.382374	PASS
		927.900000	PASS

GFSK_902.000066



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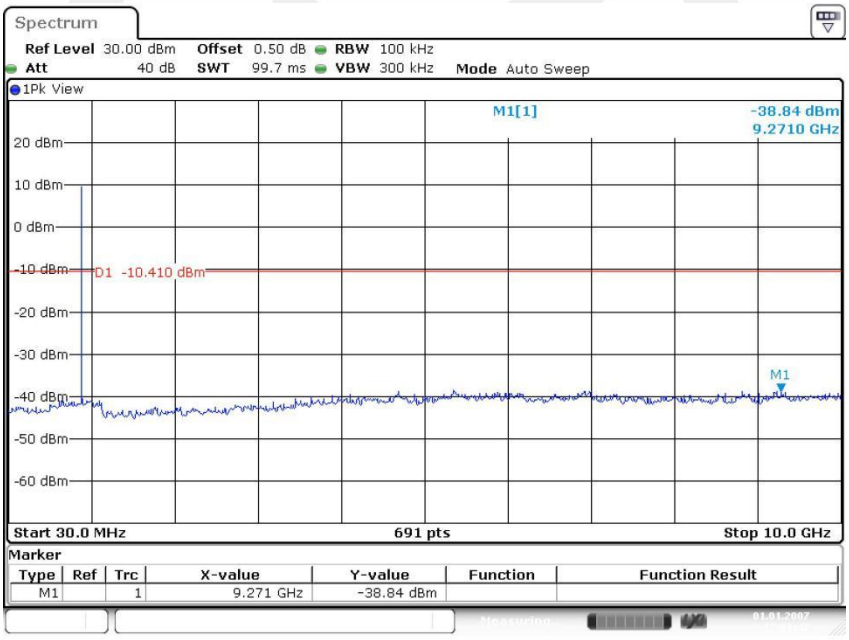

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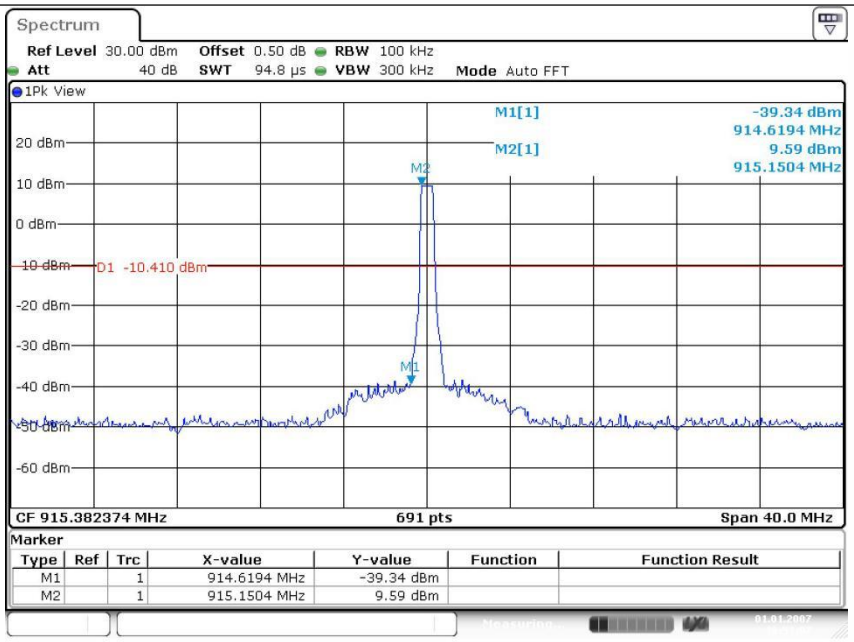
GFSK_915.382374



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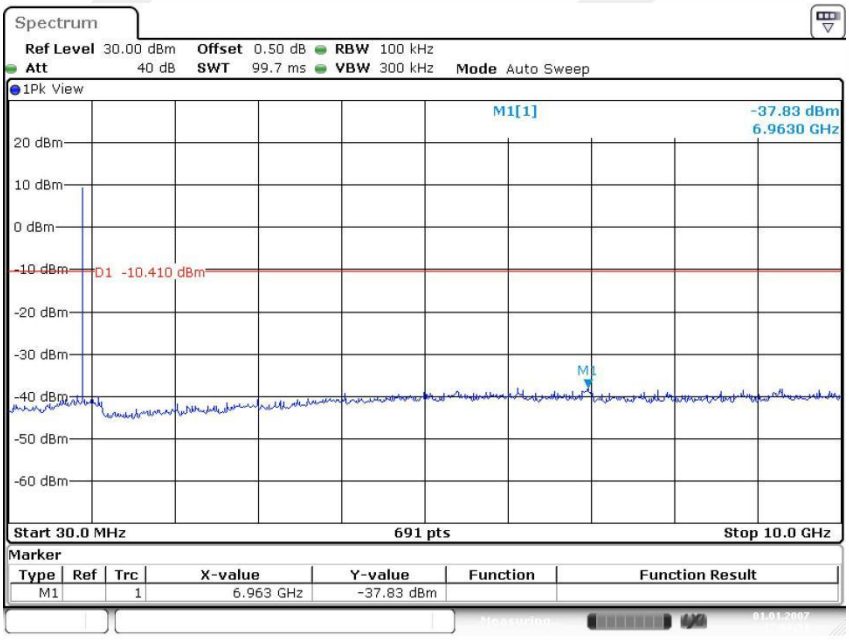

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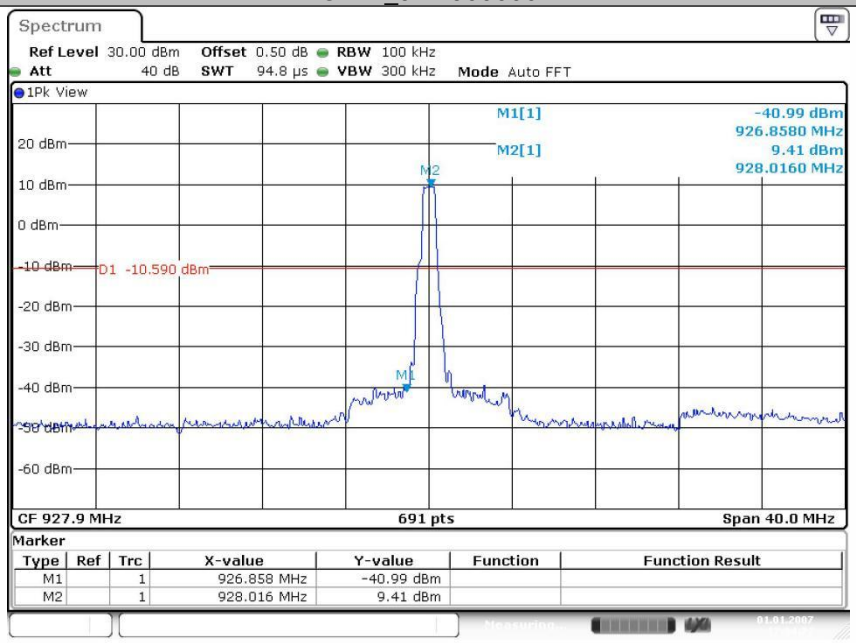
GFSK_927.900000



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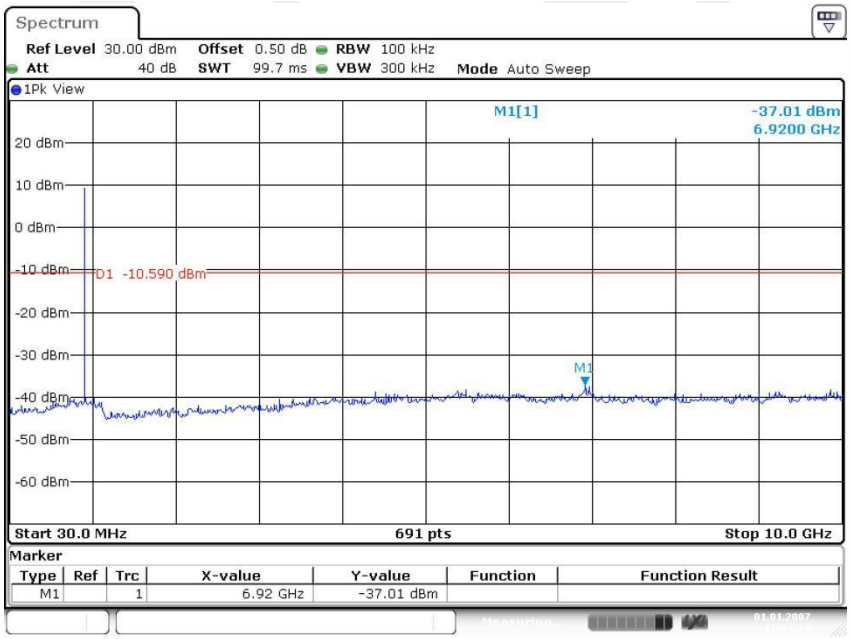


Date: 1.JAN.2007 17:05:29

8.6 RADIATED SPURIOUS EMISSION

8.6.1 Applicable Standard

According to FCC Part 15.247(d), 15.205, 15.209
According to RSS-Gen and RSS-247
According to 558074 D01 15.247 Meas Guidance v05r02 Section 8.6
According to ANSI C63.10 Section 11.12

8.6.2 Conformance Limit

According to FCC Part 15.247(d): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
According to FCC Part15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

According to FCC Part15.205, the level of any transmitter spurious emission in Restricted bands shall not exceed the level of the emission specified in the following table

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009-0.490	2400/F(KHz)	20 log (uV/m)	300
0.490-1.705	24000/F(KHz)	20 log (uV/m)	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

8.6.3 Test Configuration

Test according to clause 7.2 radio frequency test setup 2

8.6.4 Test Procedure

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:
For Above 1GHz:
The EUT was placed on a turn table which is 1.5m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 1 MHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
For average measurements the resolution bandwidth of spectrum analyzer is 1 MHz with the video bandwidth is ≥ 1/T with peak detector.
For Below 1GHz:
The EUT was placed on a turn table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 100 kHz for
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
For Below 30MHz:
The EUT was placed on a turn table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 9kHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
For Below 150KHz:
The EUT was placed on a turn table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 200Hz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Follow the guidelines in ANSI C63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit. Submit this data.

8.6.5 Test Results

Temperature:	25 ℃
Relative Humidity:	54%
ATM Pressure:	1011 mbar
Test Engineer:	XXH

■ Spurious Emission below 30MHz (9KHz to 30MHz)

For Spurious Emission below 30MHz (9KHz to 30MHz), was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

■ Spurious Emission Above 1GHz (1GHz to 25GHz)

All modulation modes have been test ed, and the worst result was reported as below:

Test mode: GFSK Lowest Frequency: 902.000066MHz

Freq.(MHz)	Ant.Pol.H/V	Emission Level(dBuV/m) PK
1802.960	V	101.77
1802.960	H	110.53

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
1802.960	V	51.13	/	81.77	/	30.64	/
2690.538	V	45.44	28.92	74.00	54.00	28.56	25.08
9962.192	V	61.19	46.73	74.00	54.00	12.81	7.27
1802.960	H	55.88	/	90.53	54.00	34.65	/
2704.941	H	43.99	35.26	74.00	54.00	30.01	18.74
9965.793	H	60.89	46.62	74.00	54.00	13.11	7.38

Test mode: GFSK Lowest Frequency: 915.382374MHz

Freq.(MHz)	Ant.Pol.H/V	Emission Level(dBuV/m) PK
1829.966	H	110.37

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
1829.966	V	48.76	48.76	74.00	54.00	25.24	5.24
7466.893	V	57.03	42.78	74.00	54.00	16.97	11.22
9951.390	V	60.73	46.78	74.00	54.00	13.27	7.22
1829.966	H	53.31	/	90.37	/	37.06	/
7488.497	H	56.91	42.40	74.00	54.00	17.09	11.60
9994.598	H	60.70	46.75	74.00	54.00	13.30	7.25

Test mode: GFSK Highest Frequency: 927.900000MHz

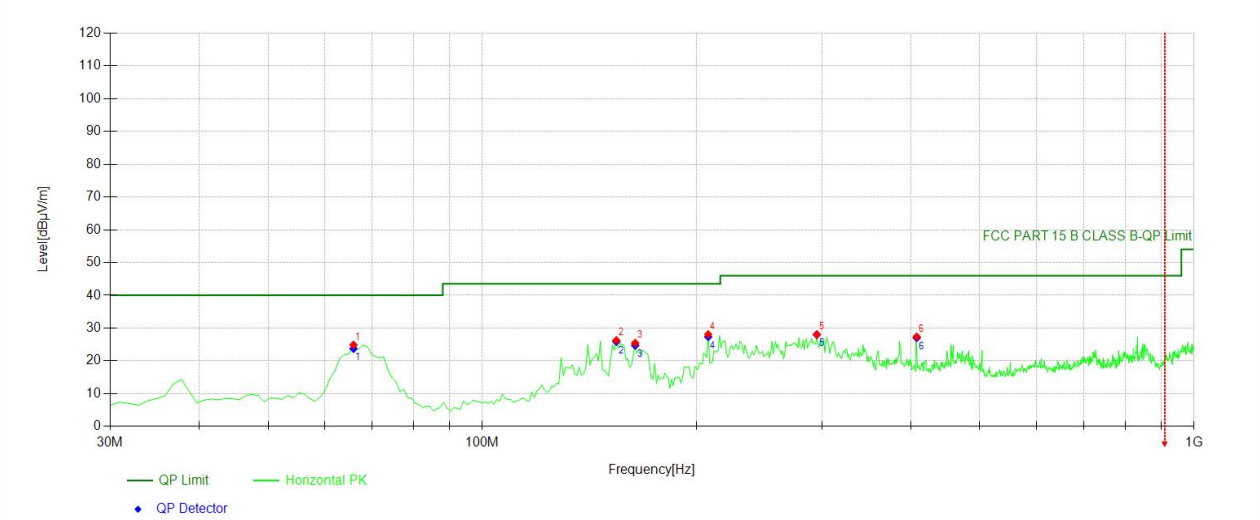
Freq.(MHz)	Ant.Pol.H/V	Emission Level(dBuV/m) PK
1855.171	V	102.34
1855.171	H	108.86

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
1855.171	V	60.40	/	82.34	/	21.94	/
7475.895	V	56.99	43.00	74.00	54.00	17.01	11.00
9978.395	V	61.06	46.76	74.00	54.00	12.94	7.24
1855.171	H	59.03	/	88.86	/	29.83	/
2782.356	H	45.23	31.77	74.00	54.00	28.77	22.23
9893.778	H	60.67	46.77	74.00	54.00	13.33	7.23

Note: (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
(2) Emission Level= Reading Level+Correct Factor.
(3) Correct Factor= Ant_F + Cab_L - Preamp
(4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

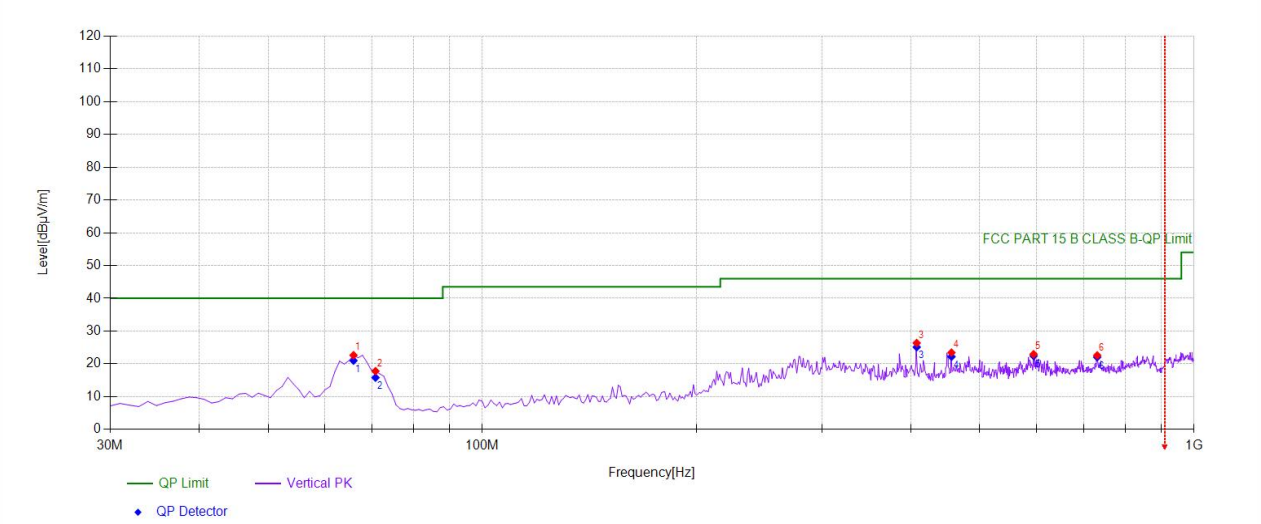
■ Spurious Emission below 1GHz (30MHz to 1GHz)
All modes have been tested, and the worst result was reported as below:

LCH: 902.000066MHz



Suspected Data List							
NO.	Freq. [MHz]	Level [dBµV/m]	Factor[dB/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	65.9259	24.88	-24.37	40.00	15.12	PK	Horizontal
2	154.284	26.29	-25.55	43.50	17.21	PK	Horizontal
3	163.994	25.45	-25.32	43.50	18.05	PK	Horizontal
4	207.687	28.08	-23.03	43.50	15.42	PK	Horizontal
5	295.075	28.05	-20.01	46.00	17.95	PK	Horizontal
6	407.707	27.38	-17.17	46.00	18.62	PK	Horizontal

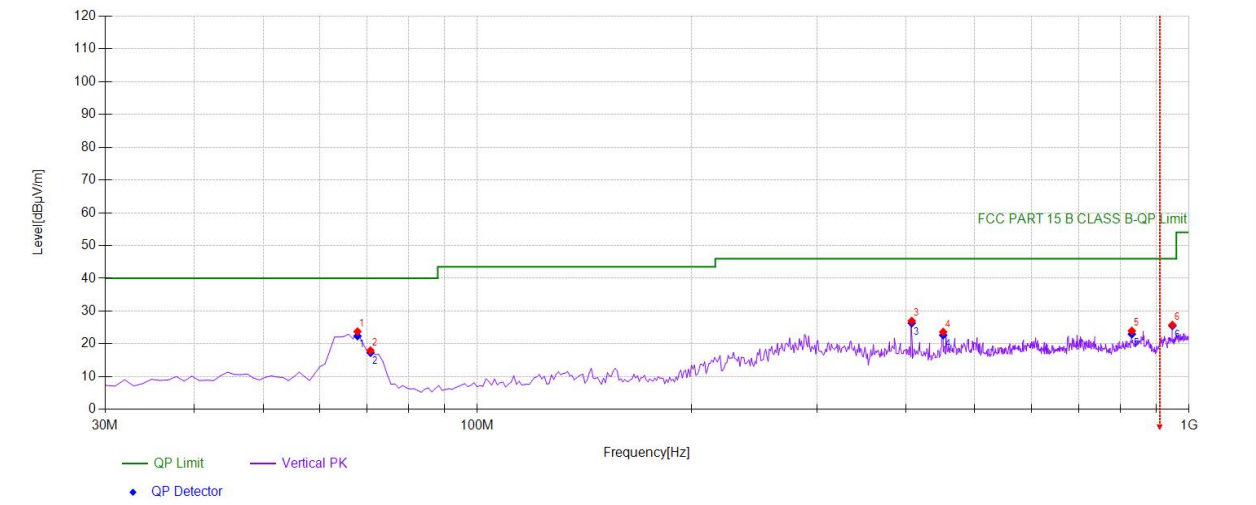
AV Final Data List			
NO.	Freq. [MHz]	Detector	Polarity
1	65.9259	AV	Horizontal
2	154.2843	AV	Horizontal
3	163.994	AV	Horizontal
4	207.6877	AV	Horizontal
5	295.0751	AV	Horizontal
6	407.7077	AV	Horizontal



Suspected Data List							
NO.	Freq. [MHz]	Level [dBµV/m]	Factor[dB/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	65.9259	22.65	-24.37	40.00	17.35	PK	Vertical
2	70.7808	17.80	-25.01	40.00	22.20	PK	Vertical
3	407.7077	26.37	-17.17	46.00	19.63	PK	Vertical
4	456.2563	23.46	-16.22	46.00	22.54	PK	Vertical
5	595.1051	22.95	-12.36	46.00	23.05	PK	Vertical
6	731.041	22.59	-11.59	46.00	23.41	PK	Vertical

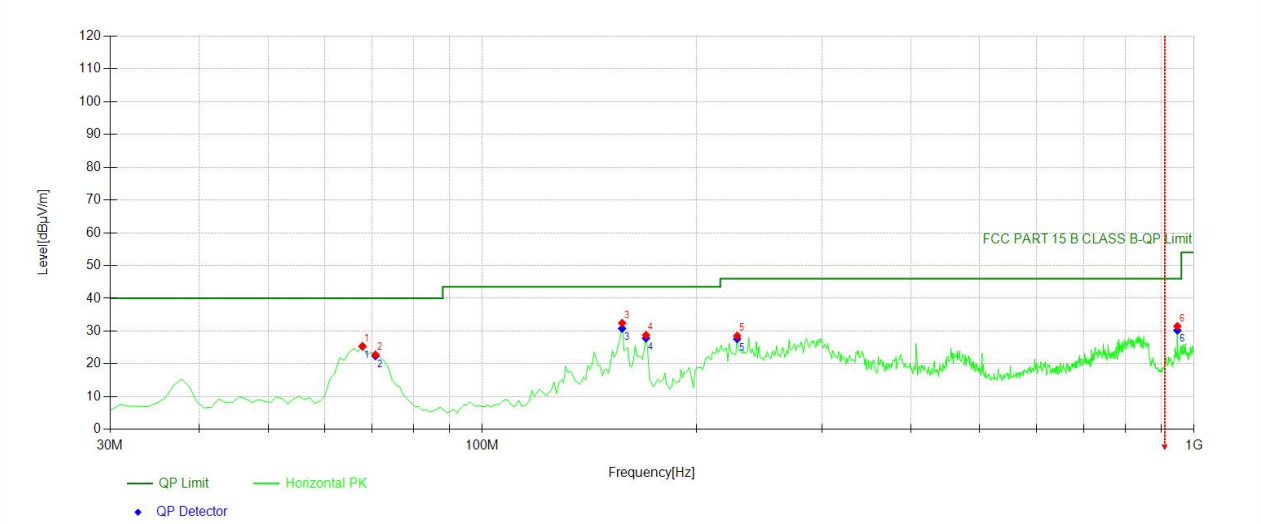
AV Final Data List			
NO.	Freq. [MHz]	Detector	Polarity
1	65.9259	AV	Vertical
2	70.7808	AV	Vertical
3	407.7077	AV	Vertical
4	456.2563	AV	Vertical
5	595.1051	AV	Vertical
6	731.041	AV	Vertical

MCH: 915.382374MHz



Suspected Data List							
NO.	Freq. [MHz]	Level [dBµV/m]	Factor[dB/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	67.8679	23.77	-24.63	40.00	16.23	PK	Vertical
2	70.7808	17.96	-25.01	40.00	22.04	PK	Vertical
3	407.7077	26.99	-17.17	46.00	19.01	PK	Vertical
4	451.4014	23.65	-16.43	46.00	22.35	PK	Vertical
5	831.0511	23.97	-10.38	46.00	22.03	PK	Vertical
6	947.5676	25.79	-8.30	46.00	20.21	PK	Vertical

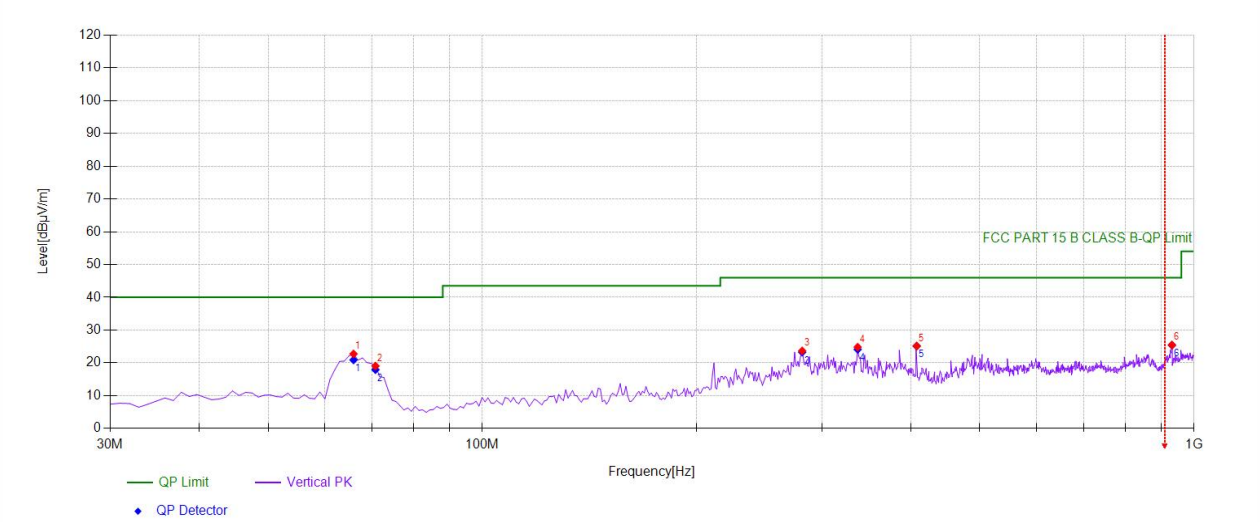
AV Final Data List			
NO.	Freq. [MHz]	Detector	Polarity
1	67.8679	AV	Vertical
2	70.7808	AV	Vertical
3	407.7077	AV	Vertical
4	451.4014	AV	Vertical
5	831.0511	AV	Vertical
6	947.5676	AV	Vertical



Suspected Data List							
NO.	Freq. [MHz]	Level [dBµV/m]	Factor[dB/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	67.8679	25.39	-24.63	40.00	14.61	PK	Horizontal
2	70.7808	22.81	-25.01	40.00	17.19	PK	Horizontal
3	157.1972	32.46	-25.53	43.50	11.04	PK	Horizontal
4	169.8198	28.78	-25.04	43.50	14.72	PK	Horizontal
5	228.0781	28.56	-21.98	46.00	17.44	PK	Horizontal
6	947.5676	31.50	-8.30	46.00	14.50	PK	Horizontal

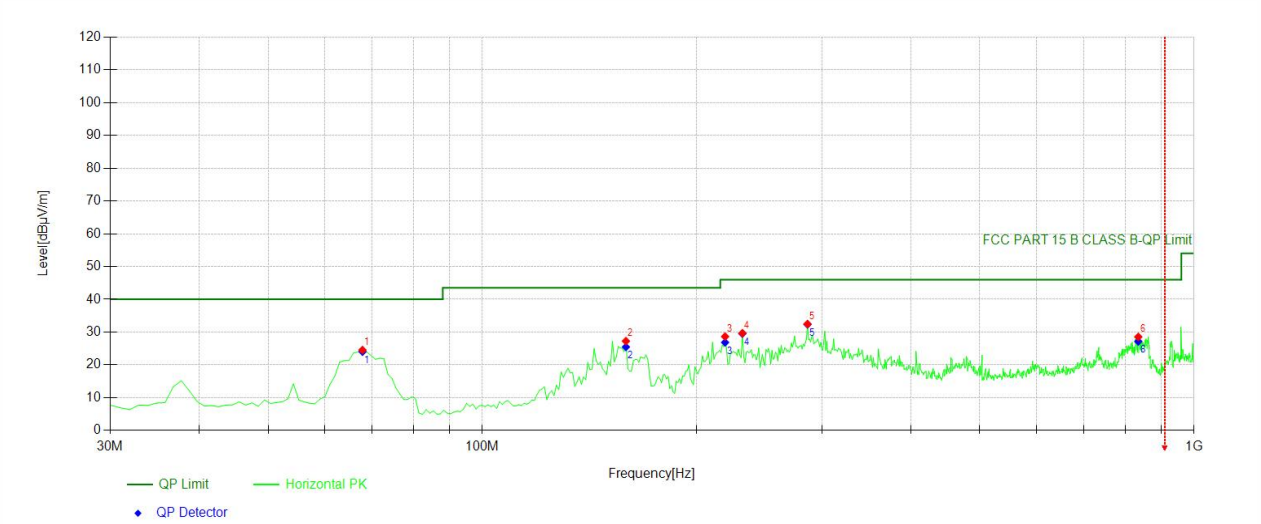
AV Final Data List			
NO.	Freq. [MHz]	Detector	Polarity
1	67.8679	AV	Horizontal
2	70.7808	AV	Horizontal
3	157.1972	AV	Horizontal
4	169.8198	AV	Horizontal
5	228.0781	AV	Horizontal
6	947.5676	AV	Horizontal

HCH: 927.900000MHz



Suspected Data List							
NO.	Freq. [MHz]	Level [dBµV/m]	Factor[dB/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	65.9259	22.75	-24.37	40.00	17.25	PK	Vertical
2	70.7808	19.05	-25.01	40.00	20.95	PK	Vertical
3	281.4815	23.67	-20.56	46.00	22.33	PK	Vertical
4	336.8268	24.84	-18.24	46.00	21.16	PK	Vertical
5	407.7077	25.15	-17.17	46.00	20.85	PK	Vertical
6	931.0611	25.44	-8.44	46.00	20.56	PK	Vertical

AV Final Data List			
NO.	Freq. [MHz]	Detector	Polarity
1	65.9259	AV	Vertical
2	70.7808	AV	Vertical
3	281.4815	AV	Vertical
4	336.8268	AV	Vertical
5	407.7077	AV	Vertical
6	931.0611	AV	Vertical



Suspected Data List							
NO.	Freq. [MHz]	Level [dBµV/m]	Factor[dB/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	67.8679	24.54	-24.63	40.00	15.46	PK	Horizontal
2	159.1391	27.25	-25.52	43.50	16.25	PK	Horizontal
3	219.3393	28.65	-22.33	46.00	17.35	PK	Horizontal
4	231.962	29.67	-21.83	46.00	16.33	PK	Horizontal
5	286.3363	32.47	-20.38	46.00	13.53	PK	Horizontal
6	834.9349	28.55	-10.36	46.00	17.45	PK	Horizontal

AV Final Data List			
NO.	Freq. [MHz]	Detector	Polarity
1	67.8679	AV	Horizontal
2	159.1391	AV	Horizontal
3	219.3393	AV	Horizontal
4	231.962	AV	Horizontal
5	286.3363	AV	Horizontal
6	834.9349	AV	Horizontal

8.7 CONDUCTED EMISSIONS TEST

8.7.1 Applicable Standard

According to FCC Part 15.207(a)
According to IC RSS-Gen 8.8

8.7.2 Conformance Limit

Conducted Emission Limit		
Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

8.7.3 Test Configuration

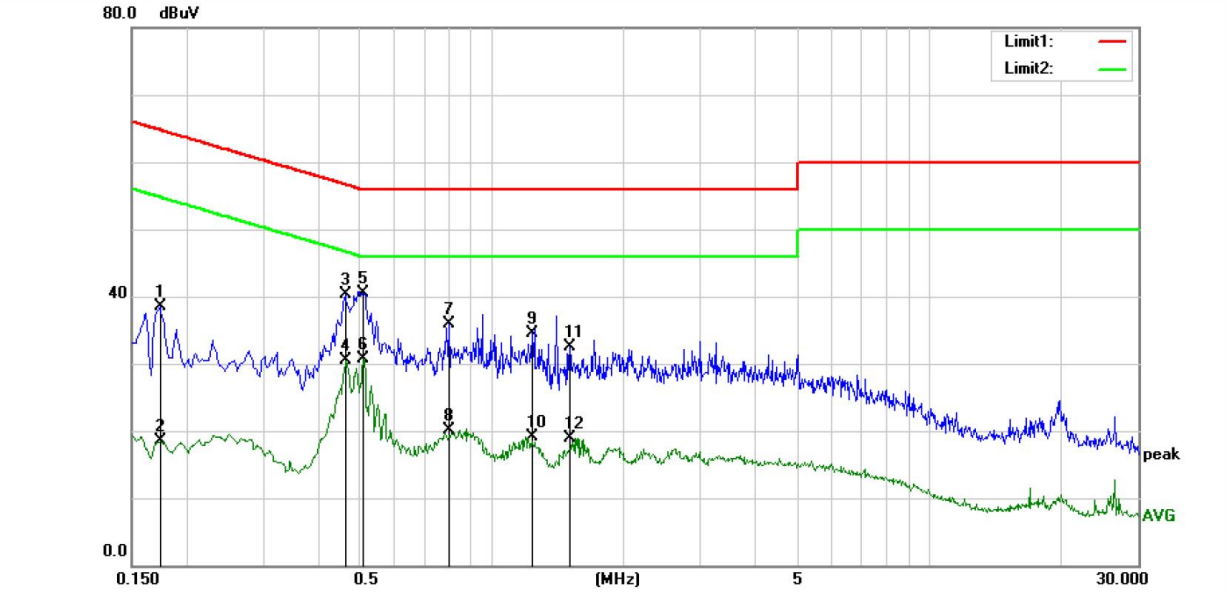
Test according to clause 7.3 conducted emission test setup

8.7.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Repeat above procedures until all frequency measured were complete.

8.7.5 Test Results

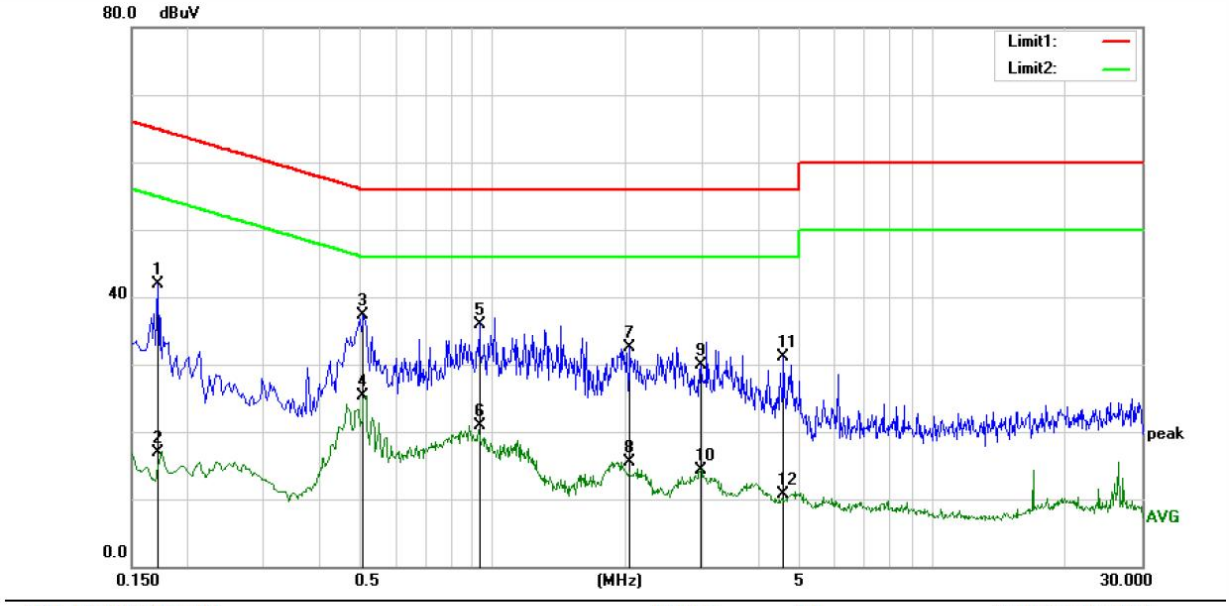
Pass
The AC120V &240V voltage have been tested, and the worst result recorded was report as below:



Site Conduction #1 Phase: *N* Temperature: 23.9

Limit: (CE)FCC PART 15 class B_QP Power: AC 120V/60Hz Humidity: 53 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1740	28.37	10.04	38.41	64.77	-26.36	QP	
2		0.1740	8.37	10.04	18.41	54.77	-36.36	AVG	
3		0.4620	30.37	9.95	40.32	56.66	-16.34	QP	
4		0.4620	20.59	9.95	30.54	46.66	-16.12	AVG	
5		0.5100	30.47	9.96	40.43	56.00	-15.57	QP	
6	*	0.5100	20.84	9.96	30.80	46.00	-15.20	AVG	
7		0.7980	25.87	9.98	35.85	56.00	-20.15	QP	
8		0.7980	10.16	9.98	20.14	46.00	-25.86	AVG	
9		1.2380	24.54	9.99	34.53	56.00	-21.47	QP	
10		1.2380	9.04	9.99	19.03	46.00	-26.97	AVG	
11		1.5060	22.59	9.98	32.57	56.00	-23.43	QP	
12		1.5060	8.89	9.98	18.87	46.00	-27.13	AVG	



Site Conduction #1 Phase: *L1* Temperature: 23.9

Limit: (CE)FCC PART 15 class B_QP Power: AC 120V/60Hz Humidity: 53 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1722	31.86	10.04	41.90	64.85	-22.95	QP	
2		0.1722	6.96	10.04	17.00	54.85	-37.85	AVG	
3	*	0.5060	27.41	9.96	37.37	56.00	-18.63	QP	
4		0.5060	15.26	9.96	25.22	46.00	-20.78	AVG	
5		0.9300	26.01	9.99	36.00	56.00	-20.00	QP	
6		0.9300	10.88	9.99	20.87	46.00	-25.13	AVG	
7		2.0540	22.63	9.97	32.60	56.00	-23.40	QP	
8		2.0540	5.47	9.97	15.44	46.00	-30.56	AVG	
9		2.9660	19.87	9.97	29.84	56.00	-26.16	QP	
10		2.9660	4.34	9.97	14.31	46.00	-31.69	AVG	
11		4.5820	21.10	9.97	31.07	56.00	-24.93	QP	
12		4.5820	0.68	9.97	10.65	46.00	-35.35	AVG	

8.8 ANTENNA APPLICATION

8.8.1 Antenna Requirement

Standard	Requirement
FCC CRF Part 15.203	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
FCC 47 CFR Part 15.247 (b)	If transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.
RSS-Gen Section 6.8	The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.
RSS-247 Section 5.4	If the transmitter employs an antenna system that emits multiple directional beams, but does not emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device (i.e. the sum of the power supplied to all antennas, antenna elements, staves, etc., and summed across all carriers or frequency channels) shall not exceed the applicable output power limit. However, the total conducted output power shall be reduced by 1 dB below the specified limits for each 3 dB that the directional gain of the antenna/antenna array exceeds 6 dBi. The directional antenna gain shall be computed as the sum of 10 log (number of array elements or staves) plus the directional gain of the element or stave having the highest gain.

8.8.2 Result

PASS.

Note: ☑ Antenna use a permanently attached antenna which is not replaceable.
☐ Not using a standard antenna jack or electrical connector for antenna replacement
☐ The antenna has to be professionally installed (please provide method of installation)

Please refer to the attached document Internal Photos to show the antenna connector.

--------- END OF REPORT --------